

# Grade 9 EQAO Assessment of Mathematics

## Academic

### Student Preparation Booklet

Name: \_\_\_\_\_

Teacher: \_\_\_\_\_

School: \_\_\_\_\_

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## **Grade 9 EQAO Assessment of Mathematics**

### **Key Words**

Throughout the assessment, key words are used to identify the type of response required from you. The key words are explained below. Refer to this sheet to make sure you are responding fully to each question.

#### **Compare:**

Tell what is the same and what is different.

#### **Describe:**

Use words to create a mental picture for the reader.

#### **Determine:**

Use mathematics to find a solution to the problem.

#### **List:**

Use point form.

#### **Explain:**

Use words and symbols to make your solution clear.

#### **Justify:**

Give reasons and evidence to show your answer is correct.

#### **Show your work:**

Record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.

## Tools you should have access to:

- Pencil, ruler and eraser
- Scientific or Graphing calculator (You may not share with another student)
- Manipulatives (examples: fraction pieces, algebra tiles, linking cubes, integer counters, 3D solids, 2D shapes ...)

## Strategies for Multiple Choice Questions:

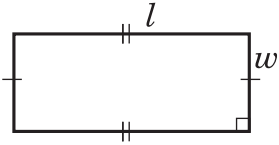
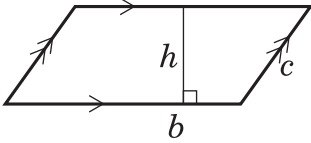
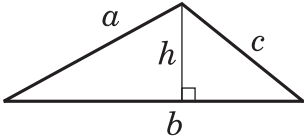
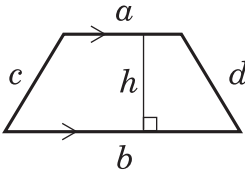
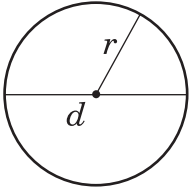
1. Cover the question choices and read the question stem carefully and highlight key words with a highlighter, especially the key words on the previous page.
2. Look at the choices and eliminate any of the responses that are not possible.
3. There is only **one** answer per question. Choose the best possible answer and shade your choice on the answer sheet.
4. Answer every question; there are no penalties for guessing.
5. Questions that have a graph are drawn to scale. Questions that have a diagram are usually not drawn to scale.

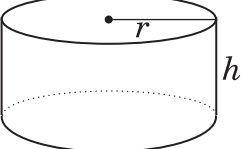
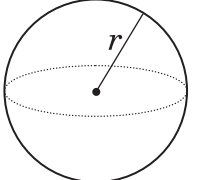
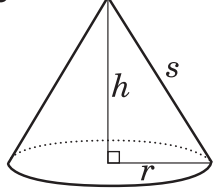
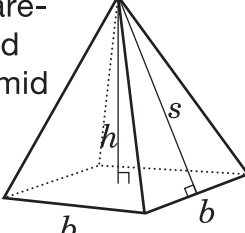
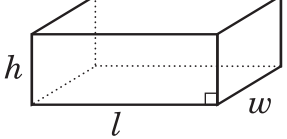
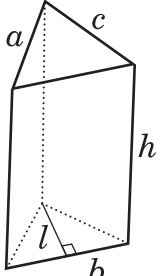
## Strategies for Open Response Questions:

1. These questions are asking you to show what you know and what you can do. Complete solutions including any rough work are expected for these questions. Give as much information as you can.
2. Read the question carefully and highlight any key words or information with a highlighter.
3. Write your solution in the space provided. Try to give a clear well-organized solution to illustrate your complete understanding and ability to communicate. Write your solution so they can be understood by someone who does not know your work.
4. Don't erase any of your calculations, drawing or reasoning. Scorers want to see all your work.
5. Use the list of key words on the previous page to help you decide what is expected in your answer. For example, "show your work" means, *record all calculations and all the steps you went through to get your answer. You may use words, numbers, graphs, diagrams, symbols and/or charts.*
6. The problems in these questions often have more than one way of being solved. Be sure to clearly explain your solution using graphs, tables, pictures numbers or words.
7. When using a calculator, write down all the numbers you use and the operations you carry out. For example to find the area of a circle of diameter 7cm you need to write  $A = \pi(3.5)^2 \approx 38.485\text{cm}^2$ .

# Formula Sheet

## Grade 9 Academic

Geometric Figure	Perimeter	Area
<p>Rectangle</p> 	$P = l + l + w + w$ or $P = 2(l + w)$	$A = lw$
<p>Parallelogram</p> 	$P = b + b + c + c$ or $P = 2(b + c)$	$A = bh$
<p>Triangle</p> 	$P = a + b + c$	$A = \frac{bh}{2}$ or $A = \frac{1}{2}bh$
<p>Trapezoid</p> 	$P = a + b + c + d$	$A = \frac{(a + b)h}{2}$ or $A = \frac{1}{2}(a + b)h$
<p>Circle</p> 	$C = \pi d$ or $C = 2\pi r$	$A = \pi r^2$

Geometric Figure	Surface Area	Volume
Cylinder 	$A_{\text{base}} = \pi r^2$ $A_{\text{lateral surface}} = 2\pi r h$ $A_{\text{total}} = 2A_{\text{base}} + A_{\text{lateral surface}}$ $= 2\pi r^2 + 2\pi r h$	$V = (A_{\text{base}})(\text{height})$ $V = \pi r^2 h$
Sphere 	$A = 4\pi r^2$	$V = \frac{4}{3} \pi r^3 \quad \text{or} \quad V = \frac{4\pi r^3}{3}$
Cone 	$A_{\text{lateral surface}} = \pi r s$ $A_{\text{base}} = \pi r^2$ $A_{\text{total}} = A_{\text{lateral surface}} + A_{\text{base}}$ $= \pi r s + \pi r^2$	$V = \frac{(A_{\text{base}})(\text{height})}{3}$ $V = \frac{1}{3} \pi r^2 h \quad \text{or} \quad V = \frac{\pi r^2 h}{3}$
Square-based pyramid 	$A_{\text{triangle}} = \frac{1}{2} b s$ $A_{\text{base}} = b^2$ $A_{\text{total}} = 4A_{\text{triangle}} + A_{\text{base}}$ $= 2bs + b^2$	$V = \frac{(A_{\text{base}})(\text{height})}{3}$ $V = \frac{1}{3} b^2 h \quad \text{or} \quad V = \frac{b^2 h}{3}$
Rectangular prism 	$A = 2(wh + lw + lh)$	$V = (\text{area of base})(\text{height})$ $V = lwh$
Triangular prism 	$A_{\text{base}} = \frac{1}{2} b l$ $A_{\text{rectangles}} = ah + bh + ch$ $A_{\text{total}} = A_{\text{rectangles}} + 2A_{\text{base}}$ $= ah + bh + ch + bl$	$V = (A_{\text{base}})(\text{height})$ $V = \frac{1}{2} b l h \quad \text{or} \quad V = \frac{b l h}{2}$

# Academic

## Grade 9 Assessment of Mathematics

2011

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the Student Answer Sheet (2011, Academic).**

Education Quality and  
Accountability Office



September 2011

Please note: The format of  
this booklet is different from  
that used for the assessment.  
The questions themselves  
remain the same.

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# Directions

Make sure you have the following materials:

- Student Answer Sheet
- the Formula Sheet
- a pencil and an eraser
- a ruler
- a scientific or graphing calculator
- some paper for rough work for multiple-choice questions only

The diagrams in this booklet are **not** all drawn to scale.

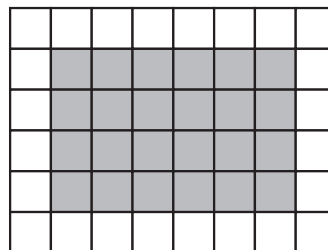
## Answering Multiple-Choice Questions


When answering the multiple-choice questions, be sure you use the Student Answer Sheet. The circles you will be filling in are lettered a, b, c, d.

1. Try to answer all of the multiple-choice questions. Do not leave a question blank.
2. Be sure to read each question and its four answer choices carefully. When you choose an answer, fill in the appropriate circle on the Student Answer Sheet. Do not spend too much time on any one question.
3. Mark only one answer for each question. Do not fill in more than one circle for a question.
4. To make a correction, cleanly erase the answer you wish to change and fill in the circle for your new answer.
5. Now do the following sample question. Fill in your choice in the sample row.

## Sample Question

- 1** Find the area of the shaded region of the rectangle below.



 1 square unit

- a 16 square units
- b 24 square units
- c 30 square units
- d 36 square units

## Sample Row on Answer Sheet

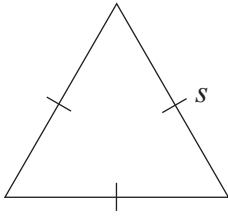
1.    ☐ a   ☒ b   ☐ c   ☐ d

You should have filled in **(b)**.

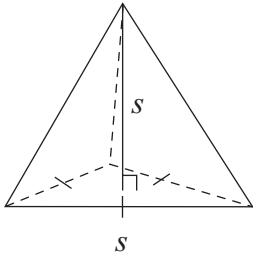


- 1** Which of the following has a volume that can be represented by  $s^3$ ?

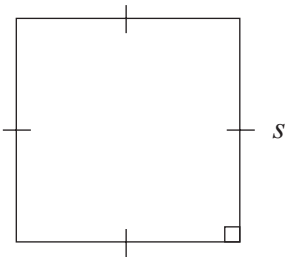
**a**



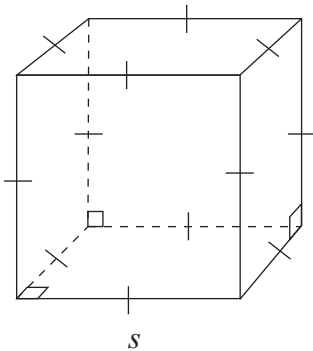
**b**



**c**



**d**



- 2** What value of  $m$  makes the equation

$$\frac{6a^m}{2a^3} = 3a^5 \text{ true?}$$

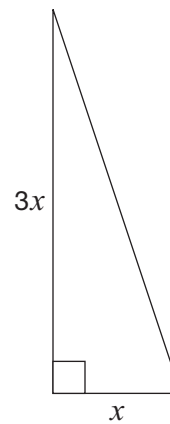
- a** 2
- b** 8
- c** 15
- d** 18

- 3** What is the value of the expression

$$\frac{5(-18 + 12)}{-4 + 1}?$$

- a** 10
- b** 6
- c** -6
- d** -10

- 4** Luke designs a garden in the shape of a right triangle as shown below.



The total area of the garden is  $96 \text{ m}^2$ .

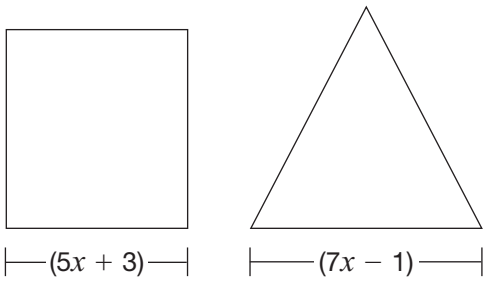
**Hint:**

$$A = \frac{1}{2}bh$$

Which is closest to the value of  $x$  in the diagram?

- a** 6 m
- b** 8 m
- c** 32 m
- d** 64 m

- 5** A square and an equilateral triangle are pictured below.



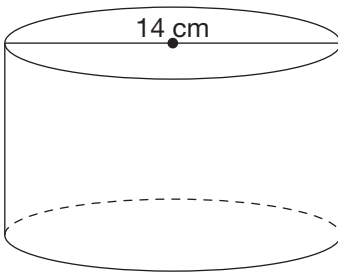
If the square and the triangle have the same perimeter, what is the value of  $x$ ?

- a 2
- b 4
- c 9
- d 15



**6 How High Is It?**

The cylinder pictured below has a surface area of  $660 \text{ cm}^2$ .



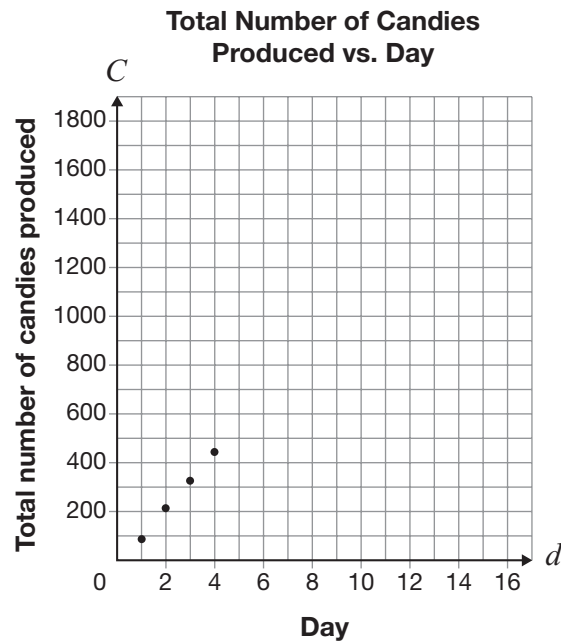
Use the following formula to determine the height of the cylinder:

$$\text{Surface area} = 2\pi r^2 + 2\pi rh$$

Show your work.



- 7** Dechen has a candy-making business. The graph below shows the total number of candies his business has produced by the end of each day for the first four days.



If this trend continues, which of the following points represents a day with more candies produced than expected?

- a (5, 500)
- b (9, 850)
- c (10, 1300)
- d (14, 1400)

- 8** Karina has a job at a video store. The total she is paid each week is made up of an hourly rate plus \$14 for transportation.

One week, she works 20 hours and is paid \$215.

Which equation represents the relationship between Karina's total pay,  $P$ , in dollars, and the number of hours she works,  $n$ ?

- a  $P = 10.75n + 14$
- b  $P = 14n + 10.75$
- c  $P = 10.05n + 14$
- d  $P = 14n + 10.05$



- 9** Which table of values shows a linear relation between  $C$  and  $n$ ?

**a**

$n$	$C$
0	0
1	2
2	4
3	8

**b**

$n$	$C$
0	0
1	1
2	4
3	9

**c**

$n$	$C$
0	0
1	4
2	11
3	15

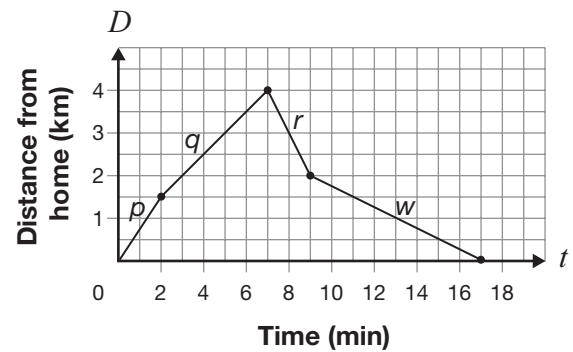
**d**

$n$	$C$
0	0
1	3
2	6
3	9

- 10** Which relation does **not** have an initial value of 50?

- a**  $y = 50$   
**b**  $y = 50 + 8x$   
**c**  $y = 50x$   
**d**  $y = 50 - x$

- 11** The graph below represents the relationship between Rena's distance from home and time.



During which section of the graph does Rena travel the fastest?

- a**  $p$   
**b**  $q$   
**c**  $r$   
**d**  $w$

- 12** The table below represents a linear relation.

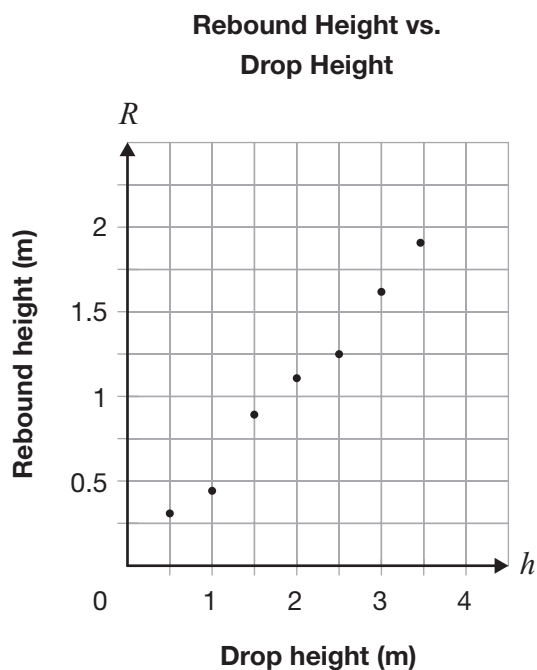
Time, $t$	Distance, $D$
0	5
1	15
2	25
3	35
4	45

Which equation represents this relation?

- a**  $D = 5t$   
**b**  $D = 10t$   
**c**  $D = 10t + 5$   
**d**  $D = 5t + 10$

**13 Follow the Bouncing Ball**

This scatter plot shows the relationship between the rebound height of a ball and the height from which the ball is dropped.



Draw a line of best fit for the data on the grid above.

Determine an equation for your line of best fit.

Show your work.

Equation of line of best fit: \_\_\_\_\_

**14 Getting Paid**

Hannah's total pay includes a base salary and a percent of her sales.

The following table shows her total pay for three different sales levels.

<b>Sales (\$)</b>	<b>Total pay (\$)</b>
15 000	1700
17 500	1825
28 000	2350

Determine Hannah's total pay when her sales are \$47 000.

Show your work.



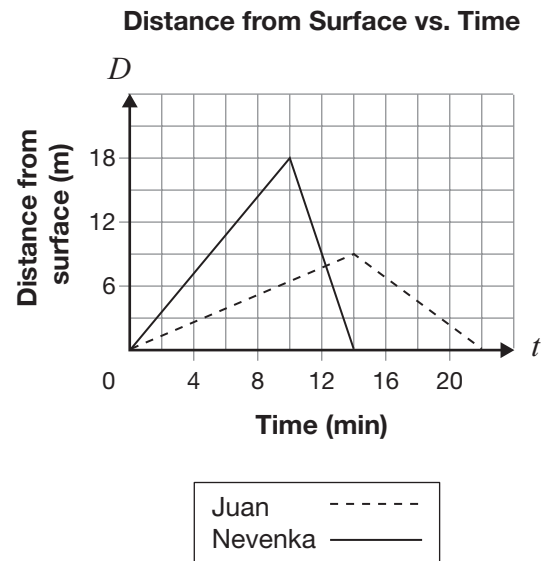
**15** Which of the following **cannot** be an equation of a line?

- a  $x = 2$
- b  $y = 7$
- c  $y = 2x^2 + 7$
- d  $2x + y + 7 = 0$

**16** Which of the following is the equation of the line  $6x - 2y - 12 = 0$  in the form  $y = mx + b$ ?

- a  $y = -3x + 6$
- b  $y = 3x - 6$
- c  $y = -\frac{1}{3}x + 12$
- d  $y = \frac{1}{3}x - 12$

**17** Nevenka and Juan scuba dive. The graph below represents the relationship between the distance from the surface, in metres, and time, in minutes, for both divers as they swim down from the surface and then swim back up.



Which statement below is true?

- a Juan swims back up at a rate of 0.5 m/min.
- b Nevenka swims back up at a rate of 4.5 m/min.
- c Nevenka swims down faster than she swims back up.
- d Juan swims down and back up at the same rate.



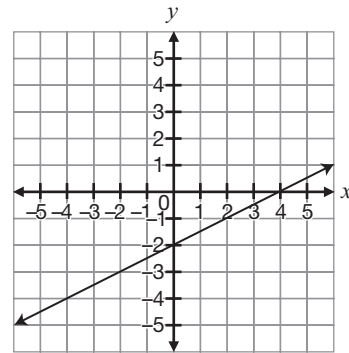
- 18** Alex has \$150. She spends the same amount each week. After 6 weeks, she has \$30 remaining.

The relationship between the amount of money Alex has and the number of weeks is represented by a line. What is the slope of this line?

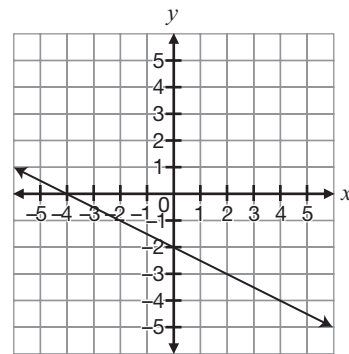
- a -25
- b -20
- c 20
- d 25

- 19** Which of the following represents the graph of the equation  $2x - 4y = 8$ ?

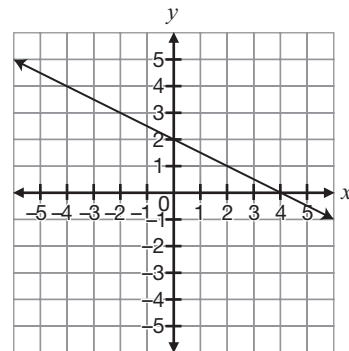
a



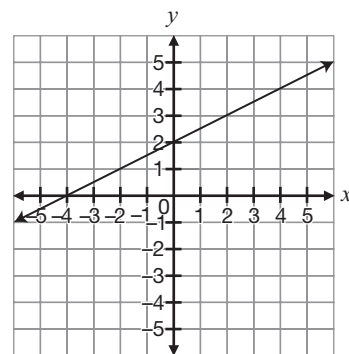
b



c



d



**20** Which equation represents a line that has the same  $y$ -intercept as  $2x + 3y - 6 = 0$ ?

- a  $y = \frac{1}{2}x + 2$
- b  $y = 2x - 2$
- c  $y = -\frac{1}{2}x + 6$
- d  $y = -2x - 6$

**21** Nate buys a video-game system.

- The system costs \$300.
- Games cost \$60 each.
- He pays 13% tax on the system and on each game.
- He has \$850 in total to spend.

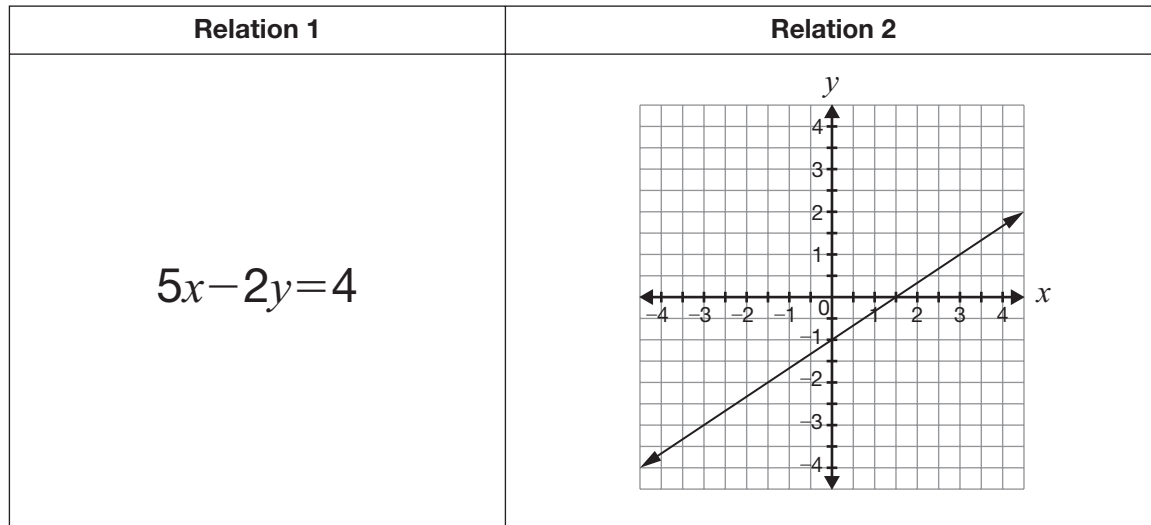
After he pays for the system, how many games is Nate able to buy?

- a exactly 12
- b exactly 9
- c no more than 7
- d no more than 3



**22 Hit the Slopes**

Consider the two relations represented below.



Determine the slope of the line representing each relation.

Show your work.

Slope of line representing Relation 1: \_\_\_\_\_

Slope of line representing Relation 2: \_\_\_\_\_

Which of these relations is represented by the steeper line?

\_\_\_\_\_

Justify your answer.

**23 How Many Uniforms?**

The equation  $C = 20n + 35$  represents the relationship between the cost of school volleyball uniforms,  $C$ , in dollars, and the number of uniforms ordered,  $n$ .

- The uniform company requires that the school order a minimum of 15 uniforms.
- The school has a maximum of \$600 to spend on the uniforms.

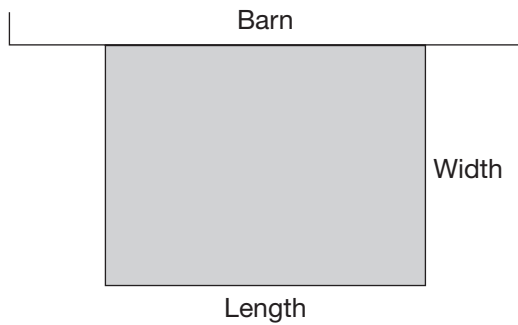
Determine the possible values for  $n$  and  $C$  in this situation.

Show your work.

The possible values for  $n$  are \_\_\_\_\_.

The possible values for  $C$  are \_\_\_\_\_.

- 24** Tom uses fencing to create a rectangular horse enclosure. He uses the side of a barn as one of the sides of the enclosure.

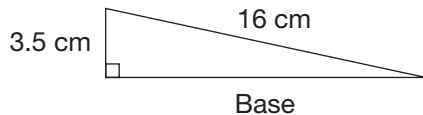


Tom has 48 metres of fencing to use for the three sides of the rectangular enclosure.

Which set of dimensions will use the entire 48 m of fencing?

- a width is 8 m, length is 6 m
- b width is 12 m, length is 12 m
- c width is 24 m, length is 12 m
- d width is 12 m, length is 24 m

- 25** Consider the following triangle.

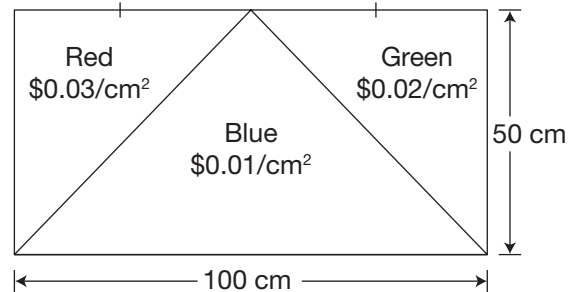


Which expression can be used in the process of determining the length of the base?

- a  $16^2 - 3.5^2$
- b  $16^2 + 3.5^2$
- c  $\sqrt{16 + 3.5}$
- d  $\sqrt{16 - 3.5}$

- 26** Pablo is designing a rectangular flag that consists of three coloured triangles.

The picture below shows the colours of the triangles and the cost of each colour of material.



What is the total cost of the material?

- a \$75.00
- b \$87.50
- c \$150.00
- d \$175.00

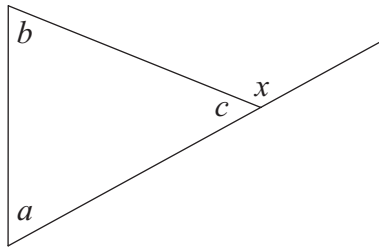
- 27** A cylinder has a volume of  $400\pi \text{ cm}^3$  and a diameter of 20 cm.

Which of the following is closest to the height of the cylinder?

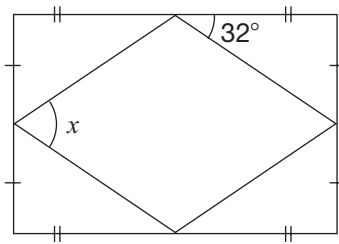
- a 1 cm
- b 4 cm
- c 20 cm
- d 40 cm

- 28** Consider the diagram below.

Which of the following equations is always true?



- a**  $x = a + b$   
**b**  $x = b + c$   
**c**  $x = a - b$   
**d**  $x = b - c$
- 29** A rectangular sign is built as shown below. The four supports for the back of the sign form four congruent triangles.



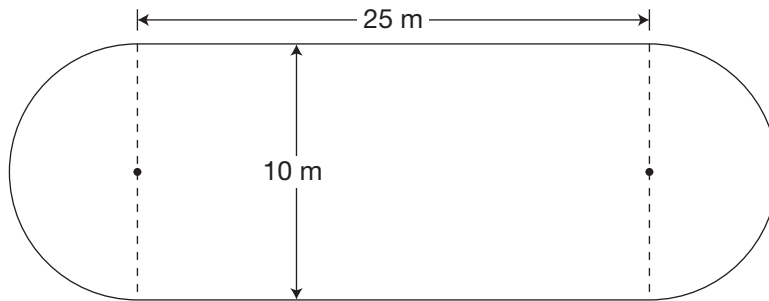
What is the value of  $x$ ?

- a**  $26^\circ$   
**b**  $32^\circ$   
**c**  $58^\circ$   
**d**  $64^\circ$



**30 Building an Ice Rink**

Jake builds an ice rink as shown below.



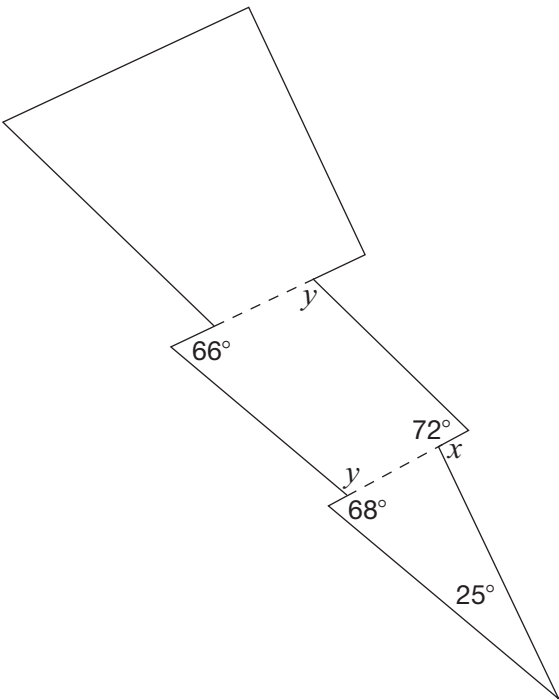
Determine the perimeter of the rink.

Show your work.



31 Shazam

Pravin designs a lightning bolt using two quadrilaterals and one triangle as shown below.



Complete the table below.  
Justify your answers using geometric properties.

Angle measure	Justification
$x = \underline{\hspace{2cm}}$	
$y = \underline{\hspace{2cm}}$	



# Sample Assessment Questions: Academic

## Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, **use a pencil to fill in the circle completely.**

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- Do not fill in more than one answer to a question.
- Do not leave a question blank.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)

2. (a) (b) (c) (d)

3. (a) (b) (c) (d)

4. (a) (b) (c) (d)

5. (a) (b) (c) (d)

6. Respond in booklet.

7. (a) (b) (c) (d)

8. (a) (b) (c) (d)

9. (a) (b) (c) (d)

10. (a) (b) (c) (d)

11. (a) (b) (c) (d)

12. (a) (b) (c) (d)

13. Respond in booklet.

14. Respond in booklet.

15. (a) (b) (c) (d)

16. (a) (b) (c) (d)

17. (a) (b) (c) (d)

18. (a) (b) (c) (d)

19. (a) (b) (c) (d)

20. (a) (b) (c) (d)

21. (a) (b) (c) (d)

22. Respond in booklet.

23. Respond in booklet.

24. (a) (b) (c) (d)

25. (a) (b) (c) (d)

26. (a) (b) (c) (d)

27. (a) (b) (c) (d)

28. (a) (b) (c) (d)

29. (a) (b) (c) (d)

30. Respond in booklet.

31. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_



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# Academic

## Grade 9 Assessment of Mathematics

2010

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the Student Answer Sheet (2010, Academic).**

Education Quality and  
Accountability Office



September 2011

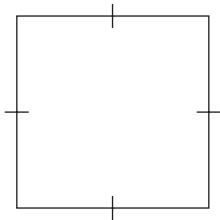
Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

Page 27 of 74

- 1** What is the value of  $6x^2$  when  $x = \frac{1}{3}$ ?

a  $\frac{2}{9}$   
 b  $\frac{2}{3}$   
 c 2  
 d 4

- 2** Chris has a square garden with an area of  $38.4 \text{ m}^2$ , as shown in the diagram.



He decreases the length of each side by 1.7 m to make a smaller garden.

Which is closest to the perimeter of the smaller garden?

a 37 m  
 b 32 m  
 c 25 m  
 d 18 m

- 3** The sum of the perimeters of two shapes is represented by  $13x + 4y$ .

The perimeter of one shape is represented by  $4x - 2y$ .

Which expression represents the perimeter of the other shape?

a  $9x + 2y$   
 b  $9x + 6y$   
 c  $17x + 2y$   
 d  $17x + 6y$

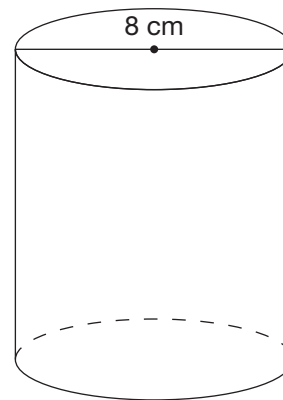
- 4** Consider the expression below.

$$3x^2(5x^2 - 2x + 1)$$

Which of the following is equivalent to this expression?

a  $8x^2 - 2x + 1$   
 b  $8x^2 + x + 4$   
 c  $15x^4 - 2x + 1$   
 d  $15x^4 - 6x^3 + 3x^2$

- 5** The cylinder below has a volume of  $150 \text{ cm}^3$ .



Which of the following is closest to the area of the lateral surface of the cylinder?

**Hint:**

$$V_{\text{cylinder}} = \pi r^2 h$$

$$A_{\text{lateral surface}} = 2\pi r h$$

a  $38 \text{ cm}^2$   
 b  $75 \text{ cm}^2$   
 c  $150 \text{ cm}^2$   
 d  $300 \text{ cm}^2$

**6 Part-Time Job**

Ezre works part-time at a clothing store. He earns \$80 per week plus 6% of the value of his weekly sales.

This week Ezre earns \$119.

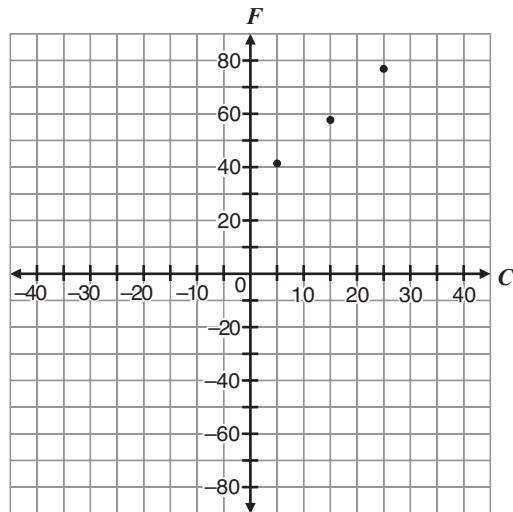
What is the total value of his sales this week?

Show your work.

The total value of his sales is \_\_\_\_\_.

- 7** Consider the following chart and graph.

Temperature in degrees Celsius, $C$	Temperature in degrees Fahrenheit, $F$
$5^{\circ}$	$41^{\circ}$
$15^{\circ}$	$59^{\circ}$
$25^{\circ}$	$77^{\circ}$



What temperature in degrees Celsius is equivalent to  $-20^{\circ}\text{F}$ ?

- a  $-4^{\circ}\text{C}$
  - b  $-18^{\circ}\text{C}$
  - c  $-29^{\circ}\text{C}$
  - d  $-40^{\circ}\text{C}$
- 8** A bus is rented for a class field trip. The transportation cost for the trip is made up of \$225 to rent the bus, \$50 for gas and \$2 for each bus seat.

Which relation below describes the total transportation cost for the trip if  $C$  is the total cost in dollars and  $n$  is the number of seats?

- a  $C = -2n + 225$
- b  $C = -2n + 275$
- c  $C = 2n + 225$
- d  $C = 2n + 275$

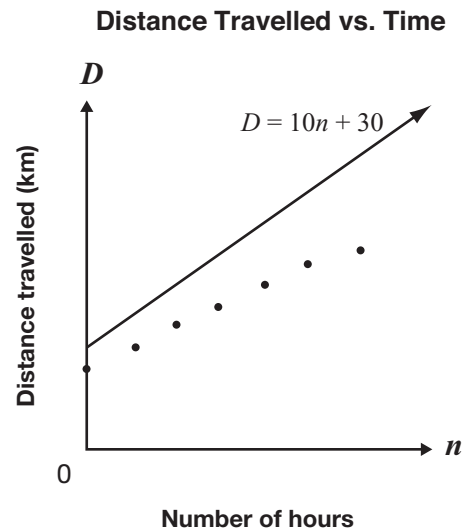
- 9** A sports company uses the equation  $C = 8t + 5$  to represent the relationship between the total amount charged to rent a canoe,  $C$ , in dollars and the rental time,  $t$ , in hours.

What is the initial charge to rent a canoe?

- a \$0
- b \$5
- c \$8
- d \$13

- 10** Data on distance travelled and the number of hours spent travelling are shown on the graph below.

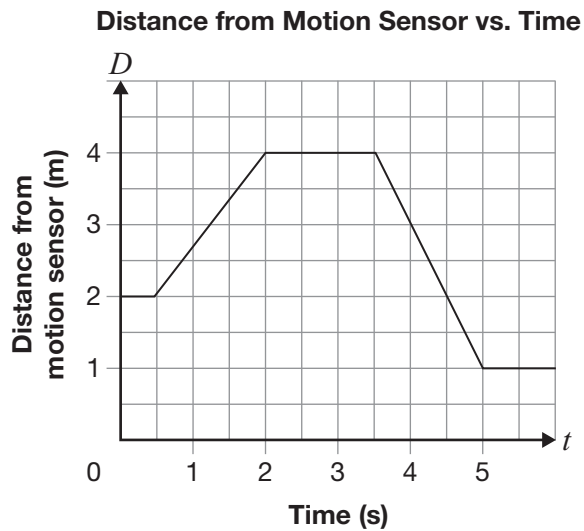
The line  $D = 10n + 30$  is also shown on the graph.



Which equation best represents the line of best fit for the data shown?

- a  $D = 5n + 33$
- b  $D = 8n + 23$
- c  $D = 10n + 18$
- d  $D = 12n + 25$

- 11** Tyler walks along a line leading from a motion sensor. The graph below shows information about Tyler's walk.

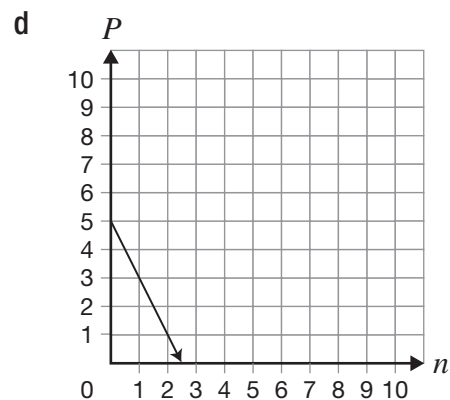
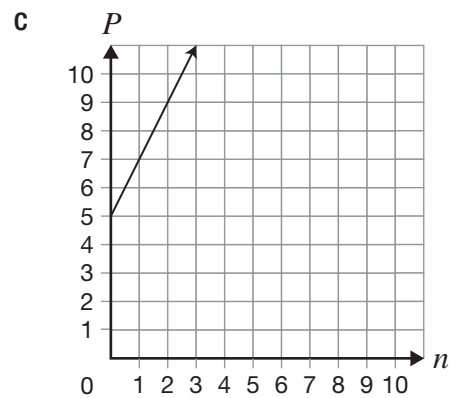
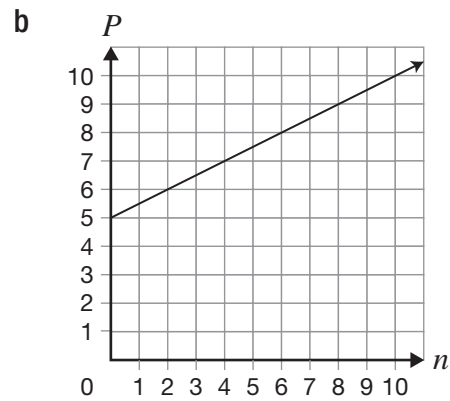
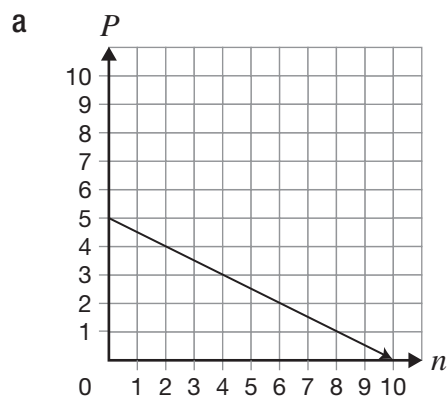


Which of the following is closest to Tyler's speed in metres per second as he walks toward the motion sensor?

- a 2.0
- b 1.3
- c 0.8
- d 0.5

- 12** Which graph represents the equation

$$P = -\frac{1}{2}n + 5?$$



**13 What's the Charge?**

The table below represents the linear relationship between cost and repair time at an appliance store.

Repair time, $t$ (h)	Cost, $C$ (\$)
3	205
6	385
8	505

Determine the initial value of this relationship. Show your work.

Initial value: \_\_\_\_\_

Is this relationship a direct or a partial variation?

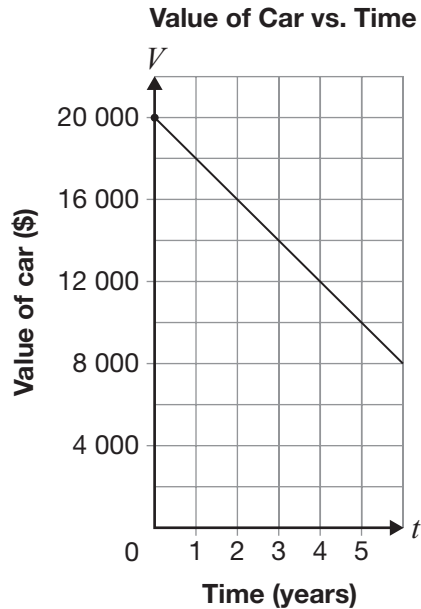
Circle one:    Direct variation    Partial variation

Justify your answer.



**14 Hot New Wheels**

Cybelle and Peter each buy a car. The graph below represents the value of Cybelle's car over time.



Peter's car costs less than Cybelle's. The value of both cars changes at the same rate.

Determine a possible equation to represent the relationship between the value of Peter's car,  $V$ , in dollars, and time,  $t$ , in years.

$V =$  \_\_\_\_\_

Justify your equation.

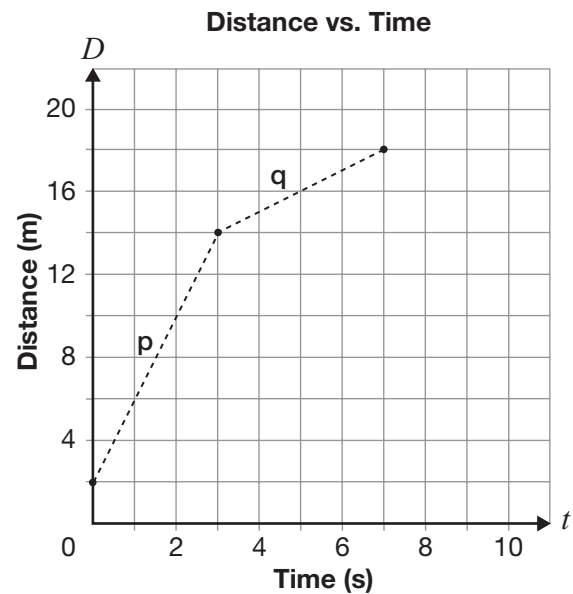
- 15** Which of the following represents an equation of a line?

a  $y = 2^x$   
b  $y = x^2 - 5$   
c  $x^2 + y^2 - 25 = 0$   
d  $2x + 3y - 5 = 0$

- 16** What are the slope,  $m$ , and  $y$ -intercept,  $b$ , of the line represented by  $3x - 2y + 16 = 0$ ?

a  $m = \frac{3}{2}, b = 8$   
b  $m = \frac{2}{3}, b = -16$   
c  $m = -\frac{2}{3}, b = -8$   
d  $m = -\frac{3}{2}, b = 16$

- 17** The graph below represents the relationship between distance and time on Javier's walk.



How much greater is Javier's speed in section p than in section q?

a 0.5 m/s  
b 1.5 m/s  
c 2.0 m/s  
d 3.0 m/s

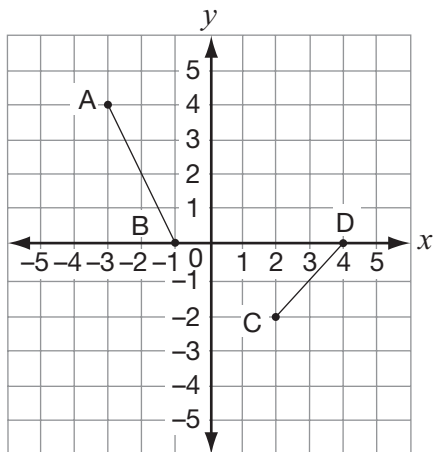
- 18** The total cost of hiring Beth's Plumbing Services is represented by the equation  $C = 50t + 70$ , where  $C$  is the total cost in dollars and  $t$  is the time in hours.

Next month, the rate will change to \$60 per hour, but the initial charge will stay the same.

Which of the following describes how the graph of the relation will change?

a The steepness of the line will increase.  
b The steepness of the line will decrease.  
c The vertical intercept will increase by 10 units.  
d The vertical intercept will decrease by 10 units.

- 19 Consider the following graph.



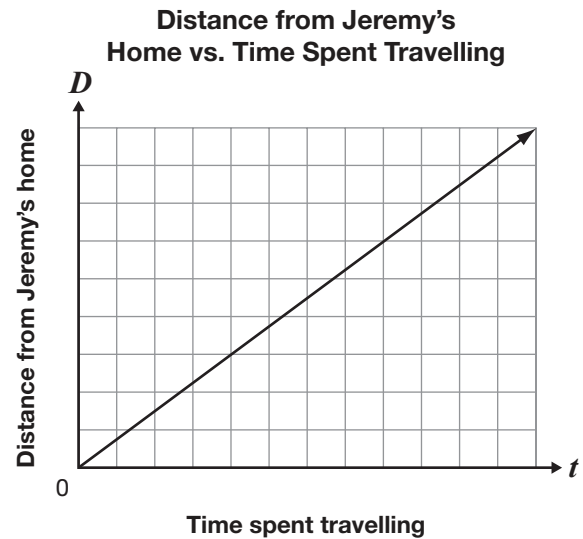
Which statement is **false**?

- a The slope of AB is  $-2$ .
- b The slope of CD is  $1$ .
- c The  $y$ -intercept of the line through CD is  $-4$ .
- d The  $y$ -intercept of the line through AB is  $-1$ .

- 20 Janelle draws a line that passes through the points  $(-1, 6)$  and  $(0, 3)$ . If Janelle writes the equation of the line in  $y = mx + b$  form, what are the values of  $m$  and  $b$ ?

- a  $m = -9$   
 $b = 3$
- b  $m = -3$   
 $b = 6$
- c  $m = -9$   
 $b = 6$
- d  $m = -3$   
 $b = 3$

- 21 Last weekend, Jeremy travelled from his home to a friend's house. The graph below represents the relation between  $D$ , the distance from Jeremy's home, and  $t$ , the time spent travelling to his friend's house.



This weekend, Jeremy travels to his friend's house but leaves from school. Jeremy's school is between his house and his friend's house.

If he travels at a faster rate this weekend, how will the line representing this trip compare to the line representing the previous trip?

This new line will

- a start at a higher point and be steeper.
- b start at a higher point and be less steep.
- c start at the current point and be steeper.
- d start at the current point and be less steep.

**22 The New Line**

A line has

- the same slope as the line represented by  $4x - 3y + 15 = 0$  and
- the same  $y$ -intercept as the line represented by  $2x + y + 6 = 0$ .

Determine an equation of this line.

Show your work.

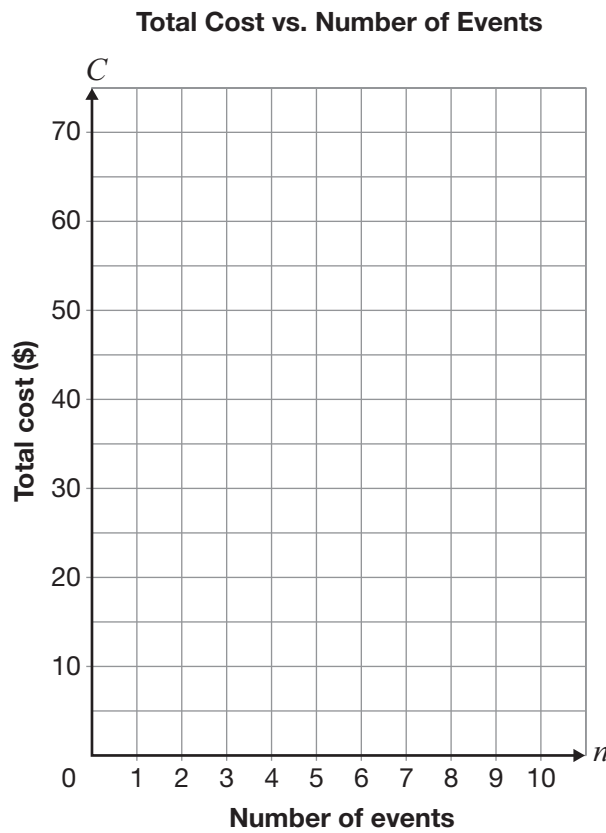
**23 Event-full**

At Lowell High School, the cost to attend special events depends on whether or not a student has purchased a \$10 discount card.

Option A: The student buys a discount card. The cost is \$5 per event.

Option B: The student does not buy a discount card. The cost is \$7.50 per event.

Graph the relationship between total cost and number of events for each option on the grid.



Determine the conditions under which a student at Lowell High School should choose each option.

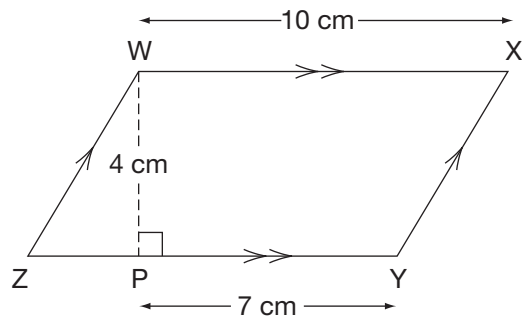
Justify your answer.

- 24** Ella wants a rectangle with
- a perimeter of 100 cm and
  - the largest possible area.

What are the dimensions of the rectangle that satisfies her conditions?

- a  $10\text{ cm} \times 10\text{ cm}$
- b  $20\text{ cm} \times 30\text{ cm}$
- c  $25\text{ cm} \times 25\text{ cm}$
- d  $40\text{ cm} \times 60\text{ cm}$

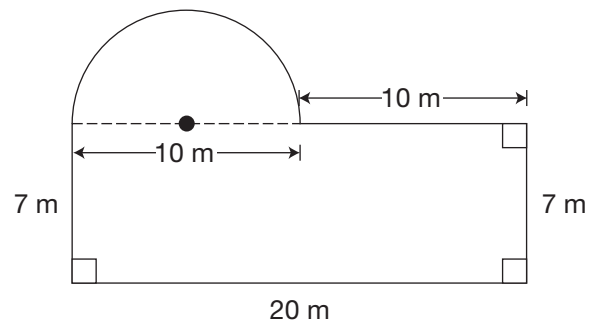
- 25** Consider the parallelogram shown below.



What is the perimeter of WXYZ?

- a 28 cm
- b 30 cm
- c 31 cm
- d 34 cm

- 26** A garden is in the shape of a rectangle and a semicircle as shown below.

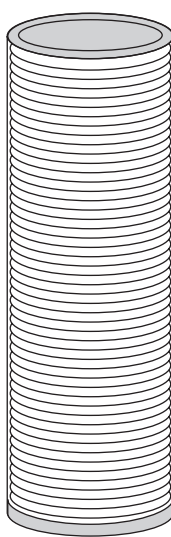


Which of the following is closest to the amount of fencing needed to enclose the garden?

- a 60 m
- b 70 m
- c 75 m
- d 85 m



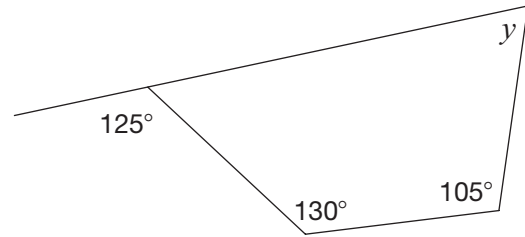
- 27** The playing chips of a board game are stored in cylindrical plastic cases. The plastic cases have a volume of  $25\,120\text{ mm}^3$  and a diameter of 40 mm.

**Playing Chip** $\leftarrow 40\text{ mm} \rightarrow$ **Plastic Case** $\leftarrow 40\text{ mm} \rightarrow$ 

Which of the following is closest to the height of one playing chip if 50 playing chips can fit tightly into the plastic case as shown above?

- a 0.1 mm
- b 0.4 mm
- c 1.3 mm
- d 2.5 mm

- 28** Consider the diagram below.



Which of the following is the value of  $y$  in the diagram?

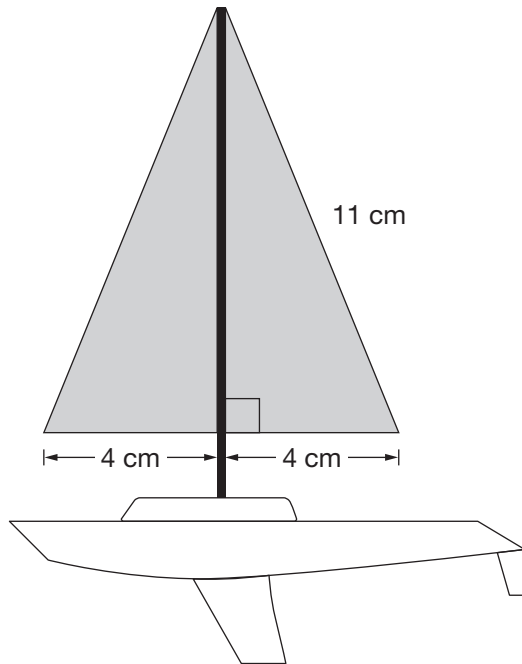
- a  $55^\circ$
- b  $70^\circ$
- c  $125^\circ$
- d  $130^\circ$

- 29** What is the sum of the interior angles of a 12-sided regular polygon?

- a  $1080^\circ$
- b  $1800^\circ$
- c  $1980^\circ$
- d  $2160^\circ$

**30 Toy Sailboats**

Emelina makes toy sailboats as shown below.



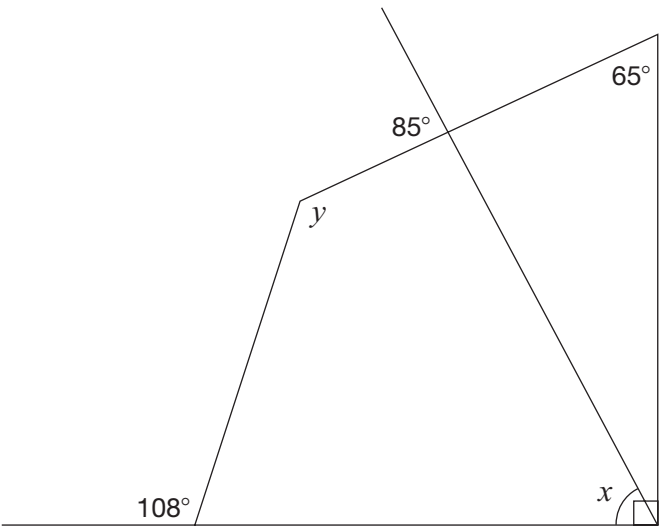
Determine the total area of the shaded sails.

Show your work.



**31 What's Missing?**

Consider the diagram below.



Complete the table below.  
Justify your answers using geometric properties.

Angle measure	Justification
$x = \rule{1cm}{0.4pt}$	
$y = \rule{1cm}{0.4pt}$	



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# Sample Assessment Questions: Academic

## Student Answer Sheet

Your multiple-choice answers must be entered on this sheet.

- To indicate your answer, use an **HB pencil to fill in the circle completely**, as shown:

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- If you fill in more than one answer to a question, the question will be scored zero.
- If you leave a question blank, the question will be scored zero.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

1. (a) (b) (c) (d)

2. (a) (b) (c) (d)

3. (a) (b) (c) (d)

4. (a) (b) (c) (d)

5. (a) (b) (c) (d)

6. Respond in booklet.

7. (a) (b) (c) (d)

8. (a) (b) (c) (d)

9. (a) (b) (c) (d)

10. (a) (b) (c) (d)

11. (a) (b) (c) (d)

12. (a) (b) (c) (d)

13. Respond in booklet.

14. Respond in booklet.

15. (a) (b) (c) (d)

16. (a) (b) (c) (d)

17. (a) (b) (c) (d)

18. (a) (b) (c) (d)

19. (a) (b) (c) (d)

20. (a) (b) (c) (d)

21. (a) (b) (c) (d)

22. Respond in booklet.

23. Respond in booklet.

24. (a) (b) (c) (d)

25. (a) (b) (c) (d)

26. (a) (b) (c) (d)

27. (a) (b) (c) (d)

28. (a) (b) (c) (d)

29. (a) (b) (c) (d)

30. Respond in booklet.

31. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_



# Academic

## Grade 9 Assessment of Mathematics

Winter 2009

### **SAMPLE ASSESSMENT QUESTIONS**

**Record your answers to the multiple-choice questions  
on the blank Student Answer Sheet (Winter 2009, Academic).**

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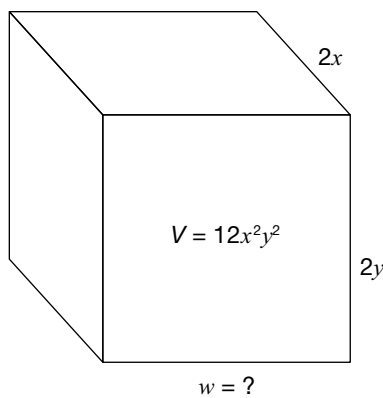


Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

**1** What is the value of  $(x^2)^3$  when  $x = \frac{1}{2}$ ?

- a  $\frac{1}{4}$
- b  $\frac{1}{12}$
- c  $\frac{1}{32}$
- d  $\frac{1}{64}$

**2** A box with a volume of  $12x^2y^2$  is shown below.

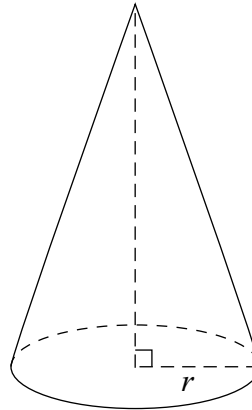


**Hint:**  $V = lwh$

What is the width of the box?

- a  $2xy$
- b  $3xy$
- c  $4x^3y^3$
- d  $8x^3y^3$

**3** The cone shown below is 20 cm high and has a total volume of  $1000 \text{ cm}^3$ .



Which of the following is closest to the length of the radius,  $r$ ?

- a 6.9 cm
- b 6.2 cm
- c 4.0 cm
- d 2.3 cm

**4** Alfredo and his wife, Jody, work in a restaurant.

Last week Alfredo received an average of \$15 in tips for each of the 55 tables he served. Jody received an average of \$20 in tips for each of the 60 tables she served.

They are planning a weekend trip. Alfredo will pay a total of \$220 for their hotel room and Jody will pay a total of \$160 for their rental car.

How much of their combined tips will be left over after they have paid for their hotel room and rental car?

- a \$1620
- b \$1645
- c \$2025
- d \$2405

**5 CD Sell-Off**

Juan belongs to a CD club that sells CDs for \$11.44 each before tax. His first shipment of CDs costs \$90.49 including 13% tax.

How many CDs are in his first shipment?

Show your work.



- 6** Which table of values represents a linear relation?

a

$x$	$y$
1	$\frac{1}{3}$
2	$\frac{2}{3}$
3	1
4	$\frac{4}{3}$

b

$x$	$y$
0	5
5	7
10	10
15	14

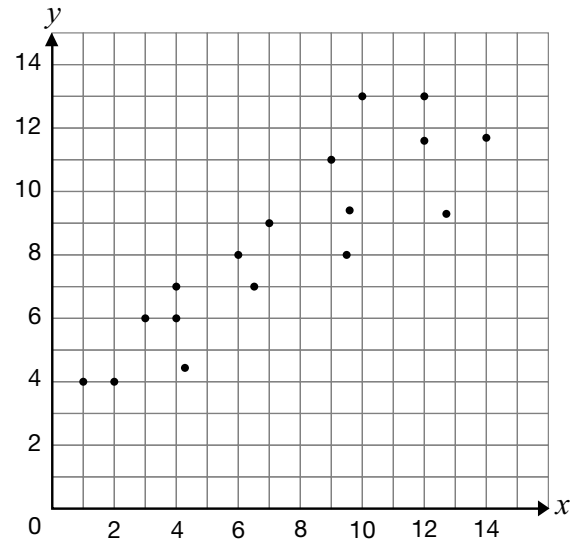
c

$x$	$y$
1	2
2	4
3	8
4	16

d

$x$	$y$
0	$\frac{1}{2}$
5	$\frac{1}{4}$
10	$\frac{1}{6}$
15	$\frac{1}{8}$

- 7** Which of the following could be the slope of a line of best fit for the data shown in the scatter plot below?

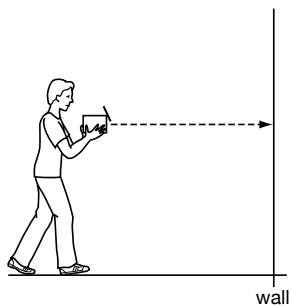


- a -2  
b -1  
c 1  
d 2



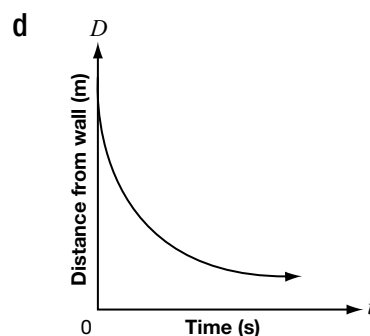
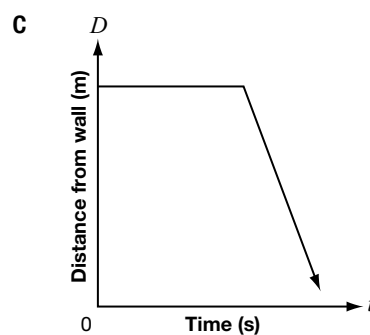
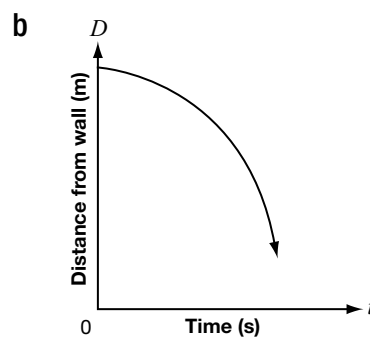
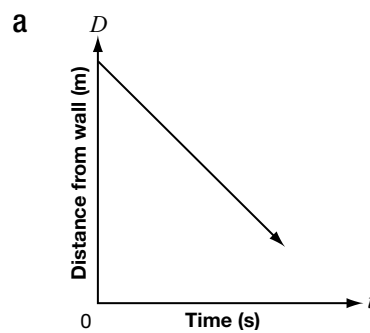


- 8** In an investigation, a student holds a motion detector, points it at a wall and walks toward the wall.



The student walks slowly at first and then speeds up as he approaches the wall.

Which of the following graphs would be produced on the graphing calculator?



- 9** The table of values below displays the cost of renting a bicycle.

Time, $t$ (h)	Cost, $C$ (\$)
0	25
1	30
2	35
3	40

Which equation models the cost of renting a bicycle?

- a**  $C = 5t$
- b**  $C = 25t$
- c**  $C = 5t + 25$
- d**  $C = 25t + 5$



**10 Picture Perfect**

The cost of producing a family photo album is \$0.50 per photo, plus a fixed cost for the album. Circle the table below that represents this scenario.

**Option 1**

Number of photos, $p$	Cost, $C$
5	\$2.50
10	\$5.00
15	\$7.50
20	\$10.00

**Option 2**

Number of photos, $p$	Cost, $C$
5	\$35.50
10	\$36.00
15	\$36.50
20	\$37.00

**Option 3**

Number of photos, $p$	Cost, $C$
5	\$37.50
10	\$40.00
15	\$42.50
20	\$45.00

Justify your choice and include an explanation of why you did not choose the other options.



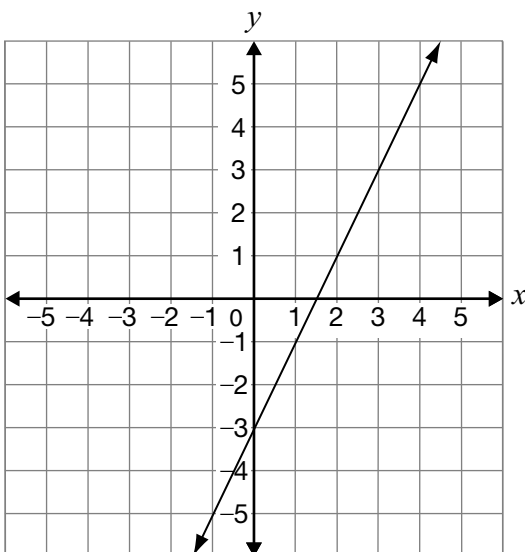
- 11** Which of the following statements is true for the line  $5x - 2y - 12 = 0$ ?

- a The slope is  $\frac{2}{5}$  and the  $y$ -intercept is 12.
- b The slope is  $-5$  and the  $y$ -intercept is 6.
- c The slope is 5 and the  $y$ -intercept is  $-12$ .
- d The slope is  $\frac{5}{2}$  and the  $y$ -intercept is  $-6$ .

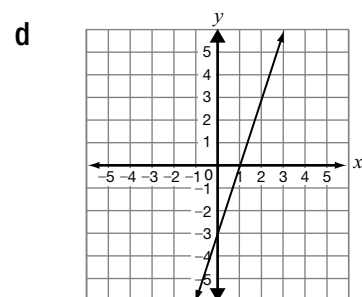
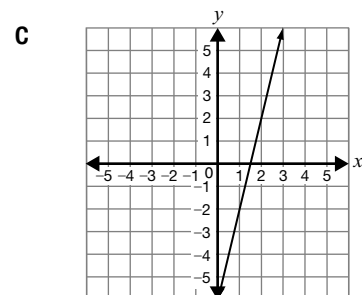
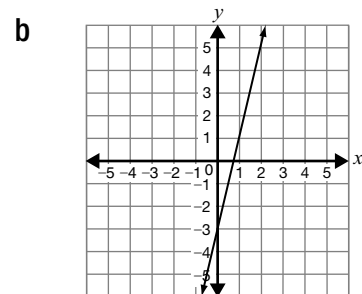
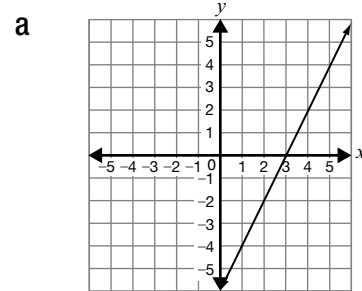
- 12** For the slope of a line, the change in  $x$  is greater than the change in  $y$ . Which of the following could represent the slope of this line?

- a  $\frac{4}{3}$
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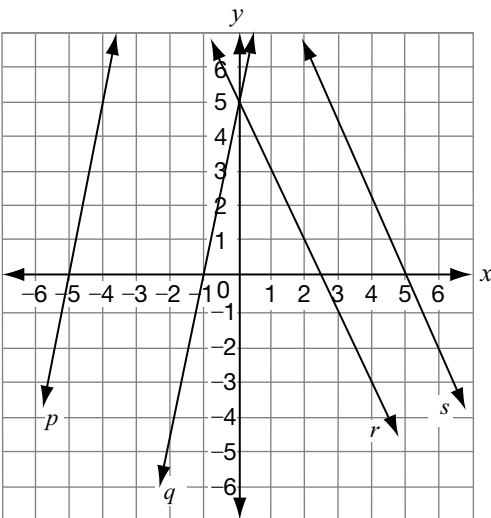
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- 14** Consider the following linear relations.



Which line represents the graph of the equation  $y = -2x + 5$ ?

- a Line  $p$
  - b Line  $q$
  - c Line  $r$
  - d Line  $s$
- 15** The following table shows values for a linear relation.

$x$	$y$
-15	-33
-9	-25
3	-9
12	3

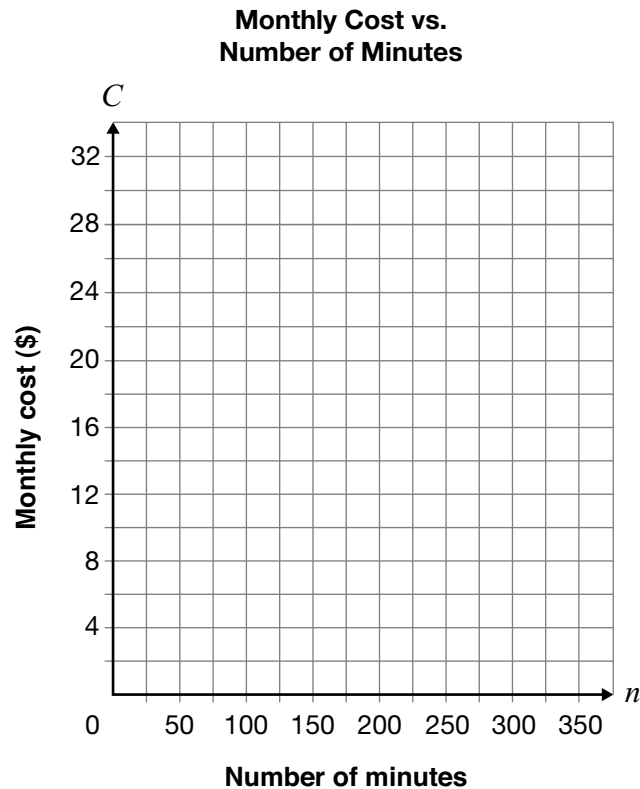
Which of the following equations represents the relationship shown in the table of values?

- a  $y = \frac{4}{3}x - 16$
- b  $y = \frac{4}{3}x - 13$
- c  $y = \frac{3}{4}x - 9$
- d  $y = \frac{3}{4}x - 6$



**16 Cellphone Plans**

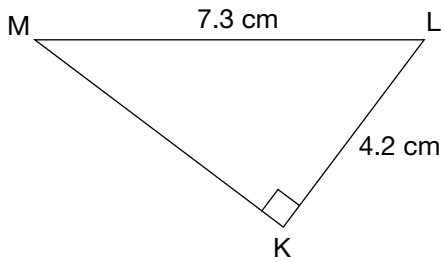
Serge is choosing a cellphone plan and wants the lowest cost. Cell-a-Bration charges \$12 per month plus \$0.05 per minute for cellphone service. E-Phone charges \$28 per month for unlimited minutes.



Determine under which conditions Serge should choose Cell-a-Bration and under which conditions Serge should choose E-Phone.

Justify your answer.

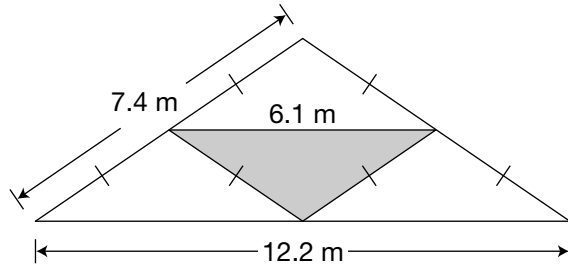
- 17** Triangle KLM is shown below.



Which of the following is closest to the perimeter of triangle KLM?

- a 12.6 cm
- b 16.3 cm
- c 17.5 cm
- d 21.0 cm

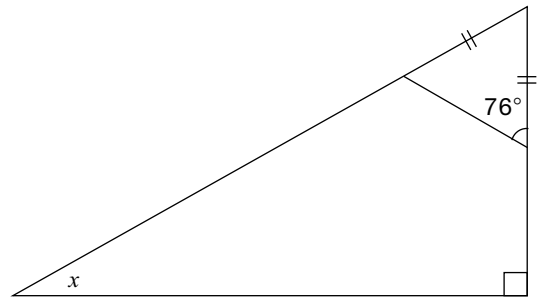
- 18** The frame of the roof of a small house is being constructed. A portion of the frame consists of four isosceles triangles as shown below.



What is the total length of the three sides that form the shaded interior triangle?

- a 3.7 m
- b 6.1 m
- c 13.5 m
- d 18.3 m

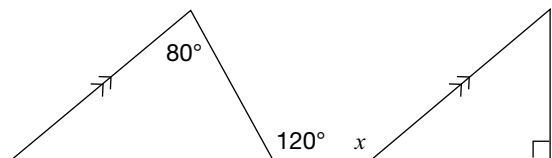
- 19** Consider the following diagram.



What is the value of  $x$ ?

- a  $14^\circ$
- b  $28^\circ$
- c  $62^\circ$
- d  $76^\circ$

- 20** Consider the diagram below.

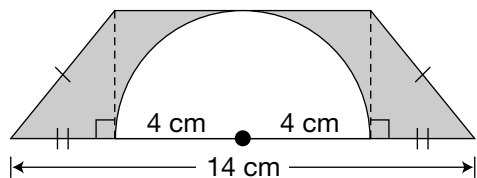


What is the value of  $x$ ?

- a  $80^\circ$
- b  $120^\circ$
- c  $140^\circ$
- d  $170^\circ$

**21 Something's Missing**

The semicircle in the diagram below has a radius of 4 cm.



What is the area of the shaded region?

Show your work.



# Sample Assessment Questions: Academic

## Student Answer Sheet

Enter your multiple-choice answers on this sheet.

- To indicate your answer, use an **HB pencil to fill in the circle completely**, as shown below:

**Like this:** ● **Not like this:** ⊗ ✓ ◐ ◑

- If you fill in more than one answer to a question, the question will be scored incorrect.
- Cleanly erase any answer you wish to change and fill in the circle for your new answer.

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3. (a) (b) (c) (d)
4. (a) (b) (c) (d)
5. Respond in booklet.

6. (a) (b) (c) (d)
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8. (a) (b) (c) (d)
9. (a) (b) (c) (d)
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12. (a) (b) (c) (d)
13. (a) (b) (c) (d)
14. (a) (b) (c) (d)
15. (a) (b) (c) (d)

16. Respond in booklet.
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18. (a) (b) (c) (d)
19. (a) (b) (c) (d)
20. (a) (b) (c) (d)
21. Respond in booklet.

**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_

**Education Quality and  
Accountability Office**



2 Carlton Street, Suite 1200, Toronto ON M5B 2M9

Telephone: 1-888-327-7377 Web site: [www.eqao.com](http://www.eqao.com)

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# Academic

## Grade 9 Assessment of Mathematics

Spring 2009

### **SAMPLE ASSESSMENT QUESTIONS**

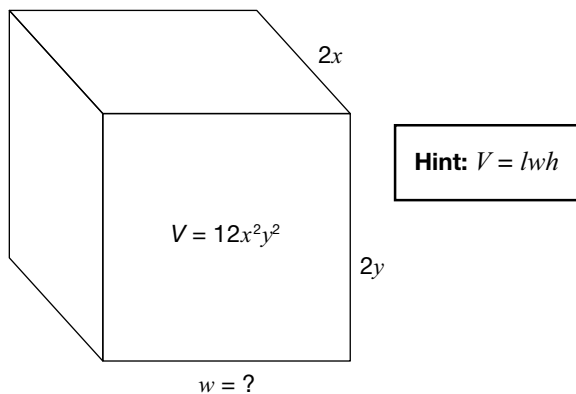
**Record your answers to the multiple-choice questions  
on the blank Student Answer Sheet (Spring 2009, Academic).**

Education Quality and  
Accountability Office



Please note: The format of  
this booklet is different from  
that used for the assessment.  
The items themselves remain  
the same.

- 1** A box with a volume of  $12x^2y^2$  is shown below.



What is the width of the box?

- a  $2xy$
  - b  $3xy$
  - c  $4x^3y^3$
  - d  $8x^3y^3$
- 2** Which of the following is equivalent to the expression below?

$$(4x - 5) + (2x + 1)$$

- a  $2x - 6$
- b  $2x - 4$
- c  $6x - 6$
- d  $6x - 4$

- 3** Alfredo and his wife, Jody, work in a restaurant.

Last week Alfredo received an average of \$15 in tips for each of the 55 tables he served. Jody received an average of \$20 in tips for each of the 60 tables she served.

They are planning a weekend trip. Alfredo will pay a total of \$220 for their hotel room and Jody will pay a total of \$160 for their rental car.

How much of their combined tips will be left over after they have paid for their hotel room and rental car?

- a \$1620
- b \$1645
- c \$2025
- d \$2405

**4 Keepin' Tabs**

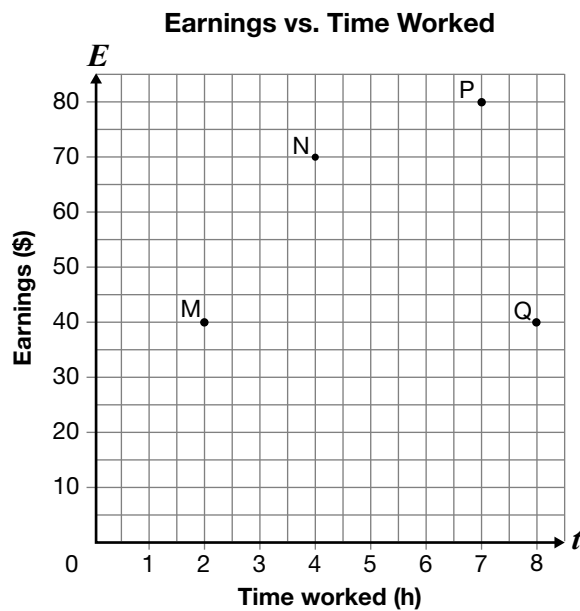
A student council collects aluminum pop tabs to raise money to purchase a wheelchair. A company buys the pop tabs for \$0.88 per kilogram.

If 1267 pop tabs have a mass of one pound, how many pop tabs are needed to purchase a wheelchair worth \$1500?

Show your work.

**Hint:** $1 \text{ kilogram} = 2.2 \text{ pounds}$ 

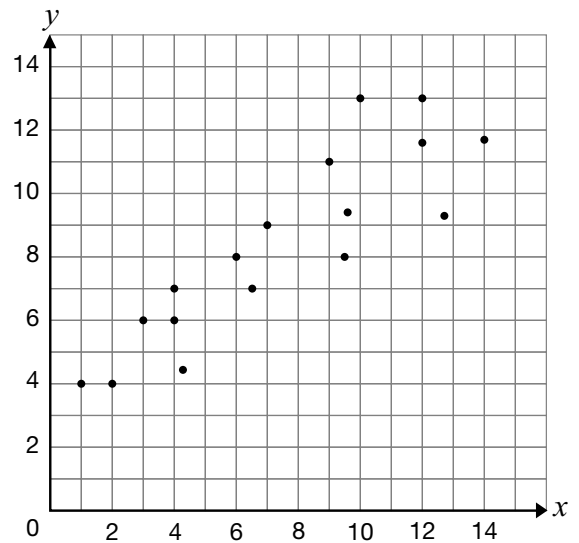
- 5** The graph below represents the relationship between earnings and time worked.



Which of the following points represents the highest rate of pay?

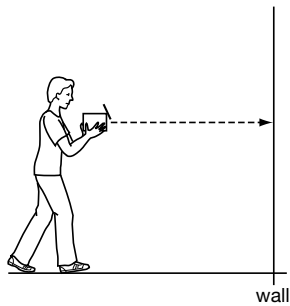
- a M
- b N
- c P
- d Q

- 6** Which of the following could be the slope of a line of best fit for the data shown in the scatter plot below?



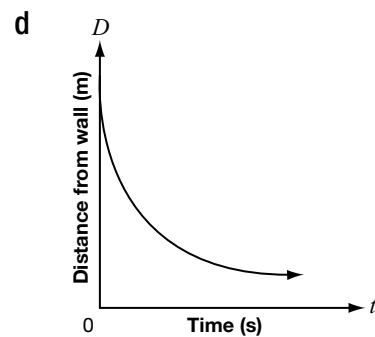
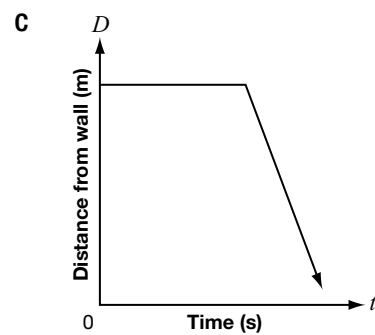
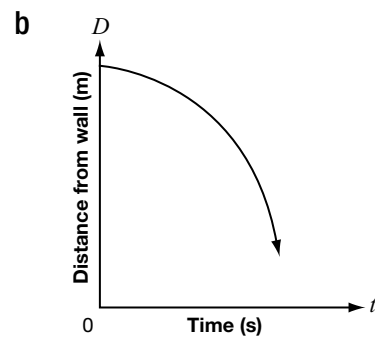
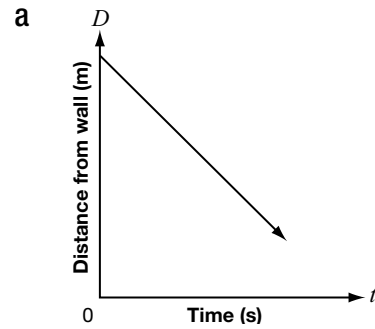
- a -2
- b -1
- c 1
- d 2

- 7** In an investigation, a student holds a motion detector, points it at a wall and walks toward the wall.



The student walks slowly at first and then speeds up as he approaches the wall.

Which of the following graphs would be produced on the graphing calculator?



- 8** The table of values below displays the cost of renting a bicycle.

Time, $t$ (h)	Cost, $C$ (\$)
0	25
1	30
2	35
3	40

Which equation models the cost of renting a bicycle?

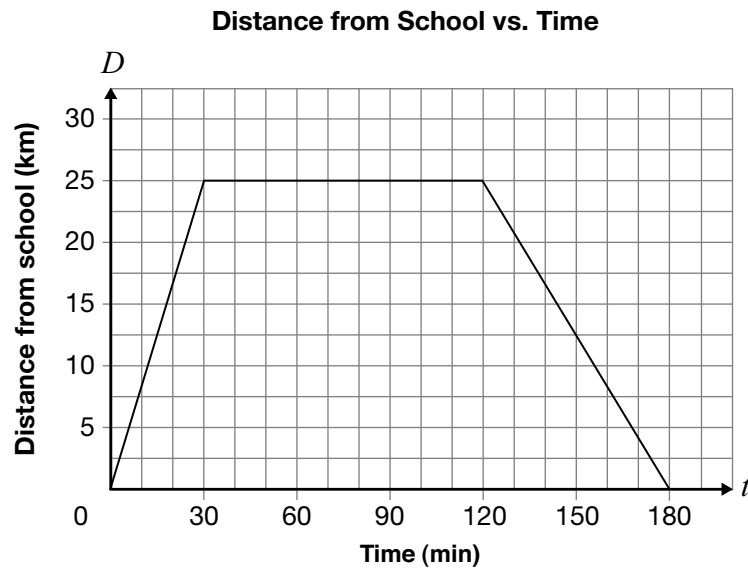
- a  $C = 5t$
- b  $C = 25t$
- c  $C = 5t + 25$
- d  $C = 25t + 5$





**9 Dogs Versus Cats**

The Bryant Bulldogs basketball team takes the bus to play the Jordan High Thundercats.



Describe the three parts of the Bulldogs' bus trip, using the information on the graph.

Include information about distance, time, direction and speed in kilometres per minute for each section of the graph.

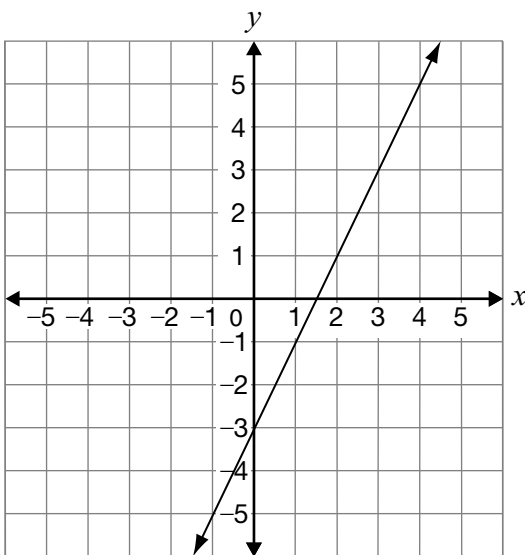
**10** Which of the following equations does **not** represent a linear relation?

- a  $x = -2$
- b  $y = 3x - 1$
- c  $y = x^2 + 3$
- d  $3x - 2y - 1 = 0$

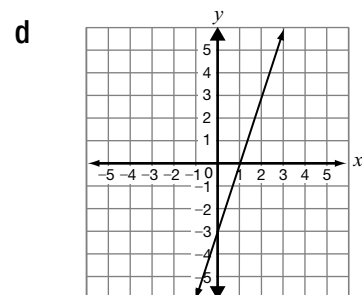
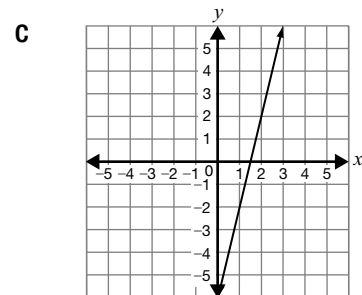
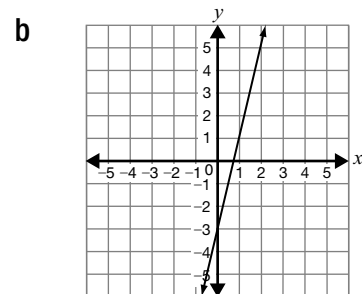
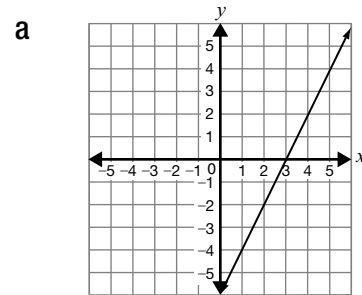
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- a  $\frac{4}{3}$
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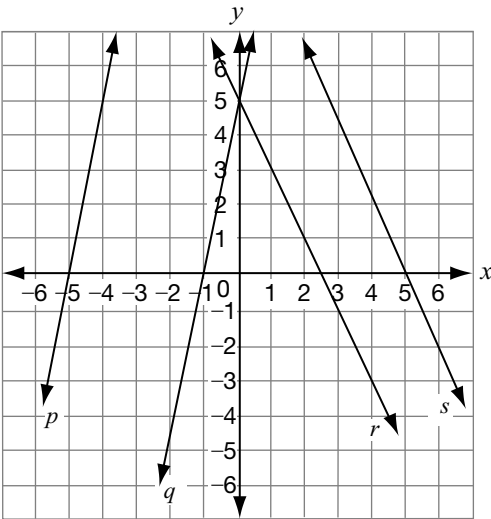
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If the slope is doubled and the  $y$ -intercept remains constant, which graph below best represents the new line?



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$x$	$y$
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Which of the following equations represents the relationship shown in the table of values?

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- b  $y = \frac{4}{3}x - 13$
- c  $y = \frac{3}{4}x - 9$
- d  $y = \frac{3}{4}x - 6$



**15 A Tale of Two Lines**

Below are the equations of two lines.

Line A:  $x - 2y + 8 = 0$

Line B:  $2x + y + 1 = 0$

Compare the two lines by considering their slopes.

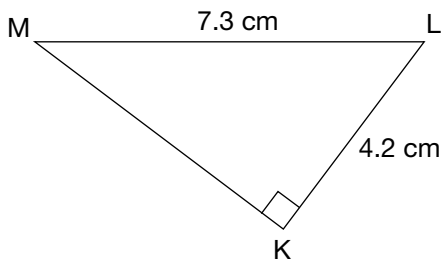
Justify your answer.

**Hint:**

Include information about

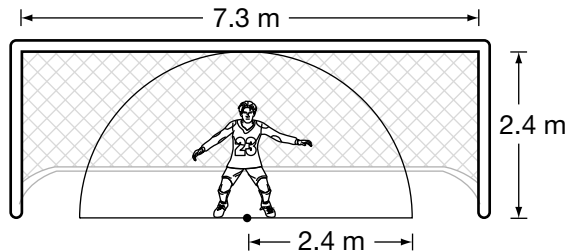
- steepness,
- direction and
- whether the lines are parallel or perpendicular, or whether they are neither.

- 16** Triangle KLM is shown below.



Which of the following is closest to the perimeter of triangle KLM?

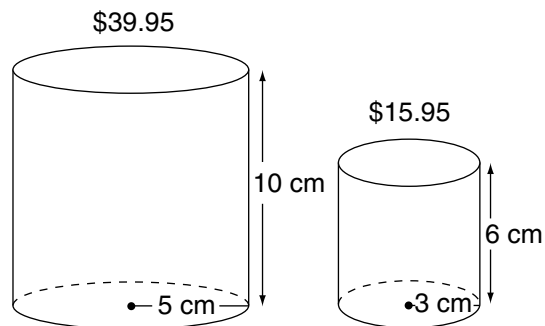
- a 12.6 cm
  - b 16.3 cm
  - c 17.5 cm
  - d 21.0 cm
- 17** A soccer goalie is standing in a goal opening. From this position, she can guard the area represented by the semicircle below.



How much of the goal opening is she not guarding?

- a  $0.6 \text{ m}^2$
- b  $8.5 \text{ m}^2$
- c  $9.0 \text{ m}^2$
- d  $26.6 \text{ m}^2$

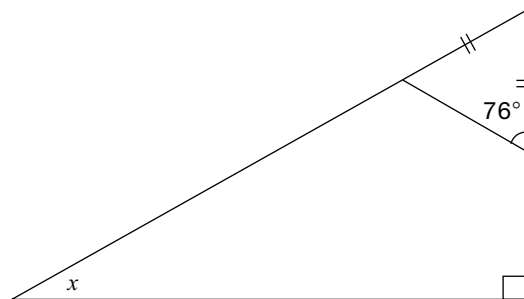
- 18** Two different stores sell coffee in cylindrical packages. The prices and dimensions of the packages from the two stores are shown below.



Which is closest to the difference between the unit prices of these two packages?

- a  $\$0.04/\text{cm}^3$
- b  $\$0.05/\text{cm}^3$
- c  $\$0.09/\text{cm}^3$
- d  $\$0.24/\text{cm}^3$

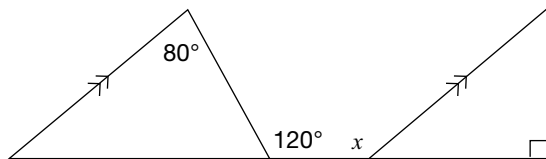
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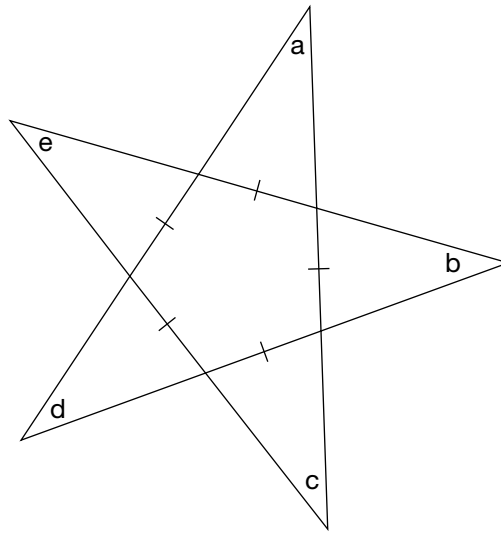
What is the value of  $x$ ?

- a  $80^\circ$
- b  $120^\circ$
- c  $140^\circ$
- d  $170^\circ$



**21 Twinkle Twinkle**

Nicole notices the star design shown below on the pavement outside a movie theatre.



Determine the sum of the angle measures in the corners of this star:  $a + b + c + d + e$ .

Justify your answer using geometric properties.

# Sample Assessment Questions: Academic

## Student Answer Sheet

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**End of Assessment**

Print Student Name: \_\_\_\_\_

Student Signature: \_\_\_\_\_







September 2011